

WHAT IS CLAIMED IS:

1. High-grade duplex stainless steel with high corrosion resistance, embrittlement resistance, castability and hot workability which suppresses formation of intermetallic phases, consisting essentially of 21.0 to 38.0% of Cr, 3.0 to 12.0% of Ni, 1.5 to 6.5% of Mo, 0 to 6.5% of W, 3.0% or less of Si, 8.0% or less of Mn, 0.2 to 0.7% of N, 0.1% or less of C, 0.0001 to 0.6% of Ba, and a balance of Fe and incidental impurities on a weight basis, a pitting resistance equivalent (PREW) defined by following formula ① satisfying $40 \leq \text{PREW} \leq 67$:

10 $\text{PREW} = \text{wt\%Cr} + 3.3(\text{wt\%Mo} + 0.5\text{wt\%W}) + 30\text{wt\%N} \text{ --- } \textcircled{1}$
2. The high-grade duplex stainless steel of claim 1, further containing 0.0001 to 1.0% of MM and/or Y in total.
- 15 3. The high-grade duplex stainless steel of claim 2, wherein Ba is added within the range of 0.001 to 0.2%.
- 20 4. High-grade duplex stainless steel with high corrosion resistance, embrittlement resistance, castability and hot workability which suppresses formation of intermetallic phases, consisting essentially of 21.0 to 38.0% of Cr, 3.0 to 12.0% of Ni, 1.5 to 6.5% of Mo, 0 to 6.5% of W, 3.0% or less of Si, 8.0% or less of Mn, 0.2 to 0.7% of N, 0.1% or less of C, 0.0001 to 1.0% of MM and/or Y in total, and a balance of Fe and incidental impurities on a weight basis, a pitting resistance equivalent (PREW) defined by following formula ① satisfying $40 \leq \text{PREW} \leq 67$:

25 $\text{PREW} = \text{wt\%Cr} + 3.3(\text{wt\%Mo} + 0.5\text{wt\%W}) + 30\text{wt\%N} \text{ --- } \textcircled{1}$
5. The high-grade duplex stainless steel of one of claims 2 to 4, wherein a value of $[\text{MM and/or Y+Al}] \cdot [\text{O+S}]$ which is a equation of solubility products of MM and/or Y, and Al, O and S of steel ranges from 0.001×10^{-5} to $30000 \times 10^{-5} [\%]^2$.

6. The high-grade duplex stainless steel of claim 5, wherein, in the case of a cast product, the value of the equation of the solubility products ranges from 1×10^{-5} to $5000 \times 10^{-5} [\%]^2$.

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7. The high-grade duplex stainless steel of claim 5, wherein, in the case of a hot working product, the value of the equation of the solubility products ranges from 0.1×10^{-5} to $2000 \times 10^{-5} [\%]^2$.

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8. The high-grade duplex stainless steel of one of claims 2 to 4, wherein a total amount of MM and/or Y ranges from 0.01 to 0.6%.

9. The high-grade duplex stainless steel of claim 8, wherein the total amount of MM and/or Y ranges from 0.2 to 0.5%.

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10. The high-grade duplex stainless steel of one of claims 1 to 4, further containing at least one element selected from the group consisting of 0.5% or less of Ca, 0.5% or less of Mg, 1.0% or less of Al, 0.5% or less of Ta, 0.5% or less of Nb, 1.5% or less of Ti, 1.0% or less of Zr, 1.0% or less of Sn and 1.0% or less of In.

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11. The high-grade duplex stainless steel of one of claims 1 to 4, further containing 0.1% or less of B.

12. The high-grade duplex stainless steel of one of claims 1 to 4, further containing one or more among 3.0% or less of Cu and 3.0% or less of Co.

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13. The high-grade duplex stainless steel of one of claims 1 to 4, wherein a value of $[\text{PREW}(\gamma) - \text{PREW}(\alpha)]$ which is a corrosion resistance balance of austenitic phase and ferritic phase ranges from -5 to 10.

14. The high-grade duplex stainless steel of one of claims 1 to 4, wherein a volume fraction of ferritic phase ranges from 20 to 70%, and a volume fraction of austenitic phase ranges from 30 to 80% on a volume basis.

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